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Hyun Huh

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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/647,297	Applicant(s) HUH ET AL.	
	Examiner Hai Vo	Art Unit 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 17-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. Rejection of claim 11 based on Molnar et al (US 6,267,644) taken alone is withdrawn in view of the present arguments (see pages 7-8 of the 05/29/2007 amendment).
However, claim 11 is now rejected over Molnar et al in view of Bruxvoort et al (US 5,958,794).
2. Rejections of other claims based on Molnar et al are maintained.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 5, 6, 9, 10, 12, 13 and 16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Molnar et al (US 6,267,644). Molnar discloses a polishing pad comprising a polishing layer composed of a polymeric matrix and finishing aids 27 substantially dispersed in the polymeric matrix as shown in figure 4. The finishing aids are selected from a group consisting of a lubricating aid and chemically reactive aid and both being free of an encapsulating film (column 40, lines 3-6). The lubricating aids include liquid and

solid lubricants and mixtures thereof (column 24, lines 23-25). The liquid lubricants comprise silicon oils, aromatic mineral oils (column 24, lines 30-32; column 25, lines 12-15). The polymer matrix is made from polyurethane resin (column 11, lines 30-35). The polishing pad further comprises a polymeric lubricant such as polyethylene glycol which has a molecular weight of 200 to 2000 (column 24, lines 1-5). The polishing pad comprises a reinforcing layer which is integrally bonded to the finishing element finishing surface layer (column 10, lines 15-20). Molnar teaches the liquid lubricants *dispersed throughout* the polymer matrix (column 24, lines 35-40). That is exactly the way the claimed liquid microelements are present in the polymeric matrix. Therefore, it is not seen that the same mechanisms would not have happened. "As polishing is continuously performed, the polishing layer surface is partially worn away or ground, exposing embedded liquid microelements. The exposed embedded liquid microelements form pores serving to collect and supply the polishing slurry". It appears that Molnar uses the same material to form the polishing pad as Applicants and both products serve the same purposes, hence, it is not seen that the open pores which are defined by the embedded liquid lubricants could not have been formed across a surface of the polishing layer as like material has like property. The same token is applied to the semi-transparent property of the polishing layer. Accordingly, Mohnar anticipates or strongly suggests the claimed subject matter.

6. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of James et al (US

6,069,080). Molnar does not specifically disclose the amount of polyethylene glycol present in the polishing pad. James, however, teaches a polishing pad for use in the manufacture of semiconductor devices comprising a urethane matrix material that includes polyethylene glycol with a molecular weight of 200-10000 and present in an amount of 20 to 60% by weight of the matrix material (column 5, lines 50-55; and column 9, lines 1-5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add polyethylene glycol in the urethane matrix material motivated by the desire to lower the modulus of the material, thereby making the phase more to wear, to dissolving or to otherwise diminishing during polishing.

Molnar does not specifically teach the polishing pad having a flow channel on the surface. James discloses the polishing pad having a flow channel on the surface (column 13, lines 20-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a structure having a flow channel on the surface of the polishing layer motivated by the desire to facilitate removal of dross during polishing and enhance the polishing action by exposing a greater number of microelements.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Merchant et al (US 6,364,744). Molnar teaches that the polishing pad comprises a reinforcing layer that is integrally bonded to the finishing element finishing surface layer (column 10, lines 15-20). This reads on Applicants' support layer which a seamless interface with the

polishing layer. Molnar does not teach a transparent reinforcing layer. Merchant, however, teaches a chemical mechanical polishing system comprising a support layer 25' and a polishing layer 24' attached to a top surface of the support layer as shown in figure 4. Merchant discloses the polishing layer and the support layer being transparent (column3, lines 48-50). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the transparent support layer motivated by the desire facilitate the light transmission through the polishing layer, thereby enhancing the photocatalytic process for breaking down water into hydrogen and oxygen in the presence of light. As a result, the released oxygen significantly enhances the oxidation of the metal surface during CMP.

8. Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Reinhardt et al (US 5,578,362). Molnar does not specifically teach a polishing pad comprising hollow polymeric microelements embedded in the polymeric matrix and open pores defined by the hollow polymeric microelements are also distributed across the surface of the polishing layer. Reinhardt, however, teaches a polymeric polishing pad comprising hollow polymeric microelements embedded in the polymeric matrix and open pores defined by the hollow polymeric microelements are also distributed across the surface of the polishing layer as shown in figure 3 (claim 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to embed the hollow polymeric microelements in the polymeric

matrix motivated by the desire to reduce the effective rigidity of the surrounding portion of the polymeric matrix, thereby providing at least two levels of hardness in the polishing pad, i.e., the work surface being softer than the subsurface (see Reinhardt, column 6, line 65 et seq.).

Molnar does not specifically teach the polishing pad having a flow channel on the surface. Reinhard discloses the polishing pad having a flow channel on the surface as shown in figures 7 and 8. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a structure having a flow channel on the surface of the polishing layer motivated by the desire to facilitate removal of dross during polishing and enhance the polishing action by exposing a greater number of microelements (see Reinhardt, column 8, lines 65-67).

9. Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Bruxvoort et al (US 5,958,794). Molnar does not specifically disclose the lubricating oils having a content as recited by the claims. Bruxvoort, however, teaches a polishing pad for polishing wafer comprising 40% to 75% by weight of the plasticizer based on the total weight of the polymeric matrix (column 2, lines 65-67). Brixvoort discloses the plasticizer including silicone oils, and castor oils. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the lubricating aids in an amount in the range instantly claimed motivated by the desire to provide cushioning effects during polishing, increase the erodability of the

polishing pad and significant cost savings because plasticizer is typically less costly than the polymer matrix.

The pore size and the average diameter of the liquid lubricants are regulated by the amount of the liquid lubricant present in the polymeric matrix in view of the teachings of the present invention. The lubricating oils of Molnar as modified by Bruxvoort are uniformly dispersed in the polymeric matrix in an amount within the claimed range, therefore, it is the examiner's position that the pore size and the average diameter of the liquid lubricants would be substantially inherently present.

Response to Arguments

10. The art rejections over Molnar have been maintained for the following reasons. Note that nothing in claim 1 is specific about a pore size and an average diameter of the embedded liquid microelements. Applicants argue that nowhere does Molnar teach or suggest the polishing pad wherein open pores defined by the embedded liquid microelements are distributed across a surface of the polishing player. The examiner respectfully disagrees. Molnar teaches the liquid lubricants *dispersed throughout* the polymer matrix (column 24, lines 35-40). That is exactly the way the claimed liquid microelements are present in the polymeric matrix. Therefore, it is not seen that the same mechanisms would not have happened. "As polishing is continuously performed, the polishing layer surface is partially worn away or ground, exposing embedded liquid microelements. The exposed embedded liquid microelements form pores serving to collect and supply the polishing slurry". It appears that Molnar uses the same material to form the polishing pad as Applicants

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and both products serve the same purposes, hence, it is not seen that the open pores which are defined by the embedded liquid lubricants could not have been formed across a surface of the polishing layer as like material has like property.

Applicants have reiterated positions taken with respect to the other rejections, the examiner's comments set forth above are equally pertinent in the support of these rejections as well.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HV

Date: August 2, 2007

/Hai Vo/
Primary Examiner, Art Unit 1771